

2. MITIGATION

This chapter presents the final recommended mitigation measures of the Surface Transportation Board's (STB or the Board) Section of Environmental Analysis (SEA) to reduce, to the extent feasible, the potential environmental impacts from the proposed Northern Rail Extension. These mitigation measures were developed after consultations with agencies, extensive environmental analyses, and consideration of mitigation suggested by stakeholders during the public comment period on the Draft Environmental Impact Statement (EIS). The mitigation measures address the potential environmental impacts of the proposed construction and operation of the Proposed Action and the alternatives that have been studied. These measures would apply to any of the alternatives unless otherwise specified in a specific mitigation measure. SEA developed some of these final recommended mitigation measures during the course of preparing this EIS. The Applicant also voluntarily developed some of the recommended mitigation measures (indicated by "VM" in the identifying number of the mitigation measure). SEA recommends that the Board impose all of the mitigation measures included in this chapter as conditions in the Board's final decision, if the Board gives final approval for the project.

Most of the recommended mitigation measures in this Final EIS appeared as preliminary or voluntary mitigation measures in the Draft EIS. However, as explained further below, SEA has modified and deleted some mitigation measures from the Draft EIS and has also added some new mitigation measures. In comments submitted to SEA, the Applicant elected to revise some of its initial voluntary mitigation measures (VM-9, VM-30, and VM-35 in the Draft EIS), and SEA has included these revised measures in the mitigation measures recommended to the Board (VM-9, VM-29, and VM-34 in this Final EIS). In addition, the Applicant proposed one additional voluntary measure, VM-23 in this Final EIS, which SEA presents in this Final EIS. SEA deleted mitigation measure VM-11 from the Draft EIS as a recommended mitigation because SEA has developed and recommended a revised version of this measure (see recommended mitigation measure 26).

SEA deleted preliminary mitigation measures 14, 15, 26, 34, 53, 59, and 65 from the Draft EIS in this Final EIS. SEA also added final recommended mitigation measures 26, 27, 28, 29, 30, 55, 68, and 69. Preliminary mitigation measure 34 was deleted and combined with preliminary measure 36 (as final recommended mitigation measure 37). Preliminary mitigation measure 59 was deleted and combined with preliminary mitigation measure 58 (as final recommended mitigation measure 59).

SEA's final recommended mitigation is arranged by environmental resource area. No mitigation is included for the environmental resource areas discussed in the EIS where SEA concluded that the impacts would be negligible (energy resources, socioeconomics, and environmental justice).

Much of the mitigation that follows is technical in nature. To assist readers, SEA has included a glossary of terms used in the mitigation measures in Section 2.12. All terms found in the glossary appear in *bold italics* in the text below.

2.1 Topography, Geology, and Soils

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential project-related impacts to topography, geology, and soils:

- VM-1 The Applicant shall be subject to U.S. Environmental Protection Agency and Alaska Department of Environmental Conservation jurisdiction under the National Pollutant Discharge Elimination System (NPDES) for stormwater discharges resulting from construction activities. Requirements that are commonly part of a Stormwater Pollution Prevention Plan associated with a NPDES Stormwater Construction Permit include the following:
- Ground disturbance shall be limited to only the areas necessary for project-related construction activities.
 - During earthmoving activities, topsoil shall be reused wherever practicable and stockpiled for later application during reclamation of disturbed areas.
 - Appropriate erosion control measures shall be employed to minimize the potential for erosion of soil stockpiles until they are removed and the area is restored.
 - Disturbed areas shall be restored as soon as practicable after construction ends along a particular stretch of rail line, and the goal of restoration shall be the rapid and permanent reestablishment of native ground cover on disturbed areas to prevent soil erosion.
 - The bottom and sides of drainage ditches shall be revegetated using natural recruitment from the native seed sources in the stockpiled topsoil or a seed mix free of invasive plant species.
 - If weather or season precludes the prompt reestablishment of vegetation, temporary erosion control measures shall be implemented.
- VM-2 The Applicant shall design rail line and *ancillary facilities* in accordance with engineering criteria related to *permafrost*, seismic events, and other geologic hazards to comply with applicable design codes. For example, the Applicant shall design the project in accordance with the latest applicable seismic codes taking into account the region's potential for earthquake activity, to mitigate potential damage to bridges and tracks.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measures as mitigation for potential impacts to topography, geology, and soils:

- 1) To minimize impacts to *permafrost* areas, the Applicant shall avoid placing bridge piers or abutments that are part of this project in known areas of permafrost, when practicable.
- 2) The Applicant shall construct the rail line and *ancillary facilities* that would occupy areas of *permafrost* in a manner that minimizes thaw and *subsidence* consistent with the reasonable requirements of the Alaska Department of Natural Resources.
- 3) At sites in the floodplain used by the Applicant to obtain gravel or other raw materials for rail line construction, the Applicant shall follow the general procedures and guidelines for material removal and site restoration, where practicable, outlined in North Slope Gravel Pit Performance Guidelines (McLean, Robert F. 1993. North Slope Gravel Pit Performance Guidelines. Alaska Department of Fish and Game (ADF&G) Habitat and Restoration Division, Technical Report No. 93-9. 37 pp + Appendices. Fairbanks, AK) or reasonable permit requirements of ADF&G, Alaska Department of Natural Resources, or other appropriate authorizing agencies.

2.2 Water Resources

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential impacts to water resources:

- VM-3 The Applicant shall develop a spill prevention, control, and countermeasure plan for petroleum products or other hazardous materials, as required by applicable Federal and state regulations, prior to initiating any project-related construction activities. The plan shall specify measures to prevent discharges and contain such discharges if they occur. The plan shall include a requirement to conduct weekly inspections of equipment for any fuel, lube oil, hydraulic, or antifreeze leaks. The plan shall provide that, if leaks are found, the Applicant shall require the contractor(s) to immediately remove the equipment from service and repair or replace it.
- VM-4 The Applicant shall obtain Federal permits required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, from the U.S. Army Corps of Engineers prior to initiation of project-related construction activities. The Applicant also agrees to obtain necessary state permits and authorizations (e.g., Alaska Department of Fish and Game Fish Habitat Permit, Alaska Department of Natural Resources Land Use Permit, and an Alaska Department of Environmental Conservation Section 401 water quality certification). The Applicant shall incorporate stipulations into construction contract specifications.
- VM-5 The Applicant shall implement compensatory mitigation for unavoidable impacts to wetlands as part of the U.S. Army Corps of Engineers Section 404 permit.
- VM-6 The Applicant shall design and construct the new rail line in such a way as to maintain natural water flow and drainage patterns to the extent practicable. This shall include placing *equalization culverts* through the embankment as necessary, preventing impoundment of water or excessive drainage, and maintaining the connectivity of floodplains and wetlands.
- VM-7 The Applicant shall disturb the smallest area practicable around any streams and, as soon as practicable following construction activities, revegetate disturbed areas using native vegetation.
- VM-8 The Applicant shall design bridges and culverts to maintain existing water patterns and flow conditions as practicable.
- VM-9 For all proposed crossings of *anadromous* waters incorporating culverts, the Applicant shall design said structures in accordance with the National Marine Fisheries Service (NMFS) 2008 publication, "Anadromous *Salmonid* Passage Facility Design" [NMFS (National Marine Fisheries Service). 2008. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.]
- VM-10 When project-related activities, such as culvert and bridge construction, require work in streambeds, the Applicant shall conduct these activities during low-flow conditions or as otherwise permitted.
- VM-11 The Applicant shall place temporary stream crossings across waterways during construction to provide access for contractors, work crews, and heavy equipment.

- VM-12 The Applicant shall avoid *overly constricting active channels* with project-related temporary crossing structures and remove the temporary structures as soon as practicable after the crossing is no longer needed.
- VM-13 As part of the National Pollutant Discharge Elimination System Stormwater Construction Permit and Stormwater Pollution Prevention Plan, during construction the Applicant shall:
- Use temporary barricades, fencing, and/or flagging to contain project-related impacts to the construction area and avoid impacts beyond the project footprint.
 - Return areas disturbed, except for the rail line embankment, to their preconstruction contours to the extent practicable, and reseed or replant with native vegetation within one growing season following construction to provide permanent stabilization and minimize the potential for erosion.
 - Use contaminant-free embankment and surface materials.
 - Use appropriate best management practices within parallel drainage ditches that are within 1,000 feet of perennial waters to provide stormwater retention and filtration. Maintain drainage ditches as necessary (e.g., by removing accumulated sediments to maintain stormwater retention capacity and function).
- VM-14 For the portions of the project within the Fairbanks North Star Borough (FNSB), the Applicant shall coordinate with the local FNSB Floodplain Administrator to ensure that new project-related stream and floodplain crossings were appropriately designed. For crossings within the mapped 100-year floodplain, drainage crossing structures shall be designed to pass a 100-year flood.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measures as mitigation for potential impacts to water resources:

- 4) In consultation with appropriate agencies, including the U.S. Fish and Wildlife Service (USFWS) and the Alaska Department of Fish and Game (ADF&G), the Applicant shall locate project-related *ancillary facilities* to minimize the size and degree of impacts to *sensitive habitat areas*. Off-ROW areas shall be restored in accordance with a reclamation plan developed in cooperation with USFWS, ADF&G, or other appropriate agency staff.
- 5) For culverts and other project-related *conveyance structures* located in active braided channels, the Applicant shall examine the seasonal and annual stages and extent of flooding for the *braided rivers* to determine and operate within the optimum construction window (to the extent practicable); estimate heights for and construct protective berms or dikes necessary to minimize flooding during the construction period; and minimize the effect on drainage patterns during flooding.
- 6) The Applicant shall avoid potential ice-jam locations and *permafrost* areas, fine-grained sediments, and steep, high streambanks when locating project-related *ice bridges* and approaches, to the extent practicable. Specially adapted best management practices, or specific requirements of the Alaska Department of Natural Resources or other appropriate authorizing agencies, shall be applied to project-related construction activities within these types of areas.

- 7) Prior to the construction of the rail line, the Applicant shall evaluate construction water needs in relation to streamflow rates and minimize effects of water supply withdrawals from *watercourses*. If the Applicant intends to use groundwater as a water supply source, it shall evaluate estimated groundwater withdrawal rates in relation to annual and seasonal recharge rates and minimize effects of water withdrawal on surface water and groundwater.
- 8) Prior to construction, the Applicant shall conduct detailed site-specific *hydraulic analyses* and modeling (e.g., as indicated in Roach, C. H. 2007. Preliminary Hydrologic and Hydraulic Study –Alaska Railroad Corporation Northern Rail Extension. Report prepared for the Alaska Railroad Corporation, Anchorage Alaska, April; and Zufelt, J. E. 2007. Effects of Ice Jamming on Water Levels near Proposed Bridge Crossing over Tanana River. Report prepared for TNH-Hanson, LLC), including examination of potential ice-jam and *scour* effects, for the Tanana River crossings to predict changes to flow paths, *velocity profiles*, and scour at high-flow discharges.
- 9) The Applicant shall conduct site-specific analyses of seasonal variations in sediment transport mechanisms before the bridge construction work proposed for Delta Creek and the Little Delta River to minimize the potential for disturbance.
- 10) The Applicant shall design, construct, and operate the rail line and *ancillary facilities*, including bridge abutments, to maintain existing water patterns and flow conditions and provide long-term hydrologic stability by conforming to natural stream gradients and stream channel alignment and avoiding altered subsurface flow, to the extent practicable. Supporting structures (e.g., bridge piers) shall be designed to minimize *scour* and increased flow velocity, to the extent practicable.
- 11) The Applicant shall design all permanent bridge structures and culverts to convey the 100-year flood event. The Applicant shall comply with all relevant and reasonable Federal Emergency Management Agency (FEMA) guidance, regulations, and procedures in the design of project-related crossings of waterbodies and floodplains with established floodway models maintained by FEMA.
- 12) The Applicant shall mitigate project-related unavoidable impacts to waters of the United States, including wetlands, to the extent practicable, in accordance with the reasonable requirements of Section 404 of the Clean Water Act.
- 13) Prior to construction, the Applicant shall complete jurisdictional delineations of wetlands and other surface waters that are subject to Section 404 of the Clean Water Act for all *ancillary facilities* proposed outside of the right-of-way.
- 14) The Applicant shall comply with the “Compensatory Mitigation for Losses of Aquatic Resources; Final Rule” (commonly referred to as the Final Mitigation Rule), which was published in the *Federal Register (FR)* on April 10, 2008, and became effective on June 9, 2008 (73 *FR* 19594-19705).

The Applicant shall implement all reasonable best management practices imposed by the U.S. Army Corps of Engineers’ (USACE) under Section 404 of the Clean Water Act to minimize project-related impacts to vegetation. Standard best management practices are specified in the USACE Alaska District’s Nationwide Permits General Best Management Practice Guide (U.S. Army Corps of Engineers, 2007. “Nationwide Permits: General Best

Management Practice.” Alaska District, Regulatory Program. Online at: <http://www.poa.usace.army.mil/reg/NWPs.htm>) and could include the following:

- Sediment and turbidity at the work site shall be contained by installing diversion or containment structures.
 - Dredge spoils or unusable excavated material not used as backfill at upland disposal sites shall be disposed of in a manner that minimizes impacts to wetlands.
 - Wetlands shall be revegetated as soon as possible, preferably in the same growing season, by systematically removing vegetation, storing it in a manner to retain viability, and replacing it after construction to restore the site.
 - Streambanks shall be restored and revegetated using techniques such as **brush layering**, **brush matting**, and use of **jute matting** and **coir logs** to stabilize soil and reestablish native vegetation.
 - Topsoil and organic surface material, such as root mats, shall be stockpiled separately from overburden and returned to the surface of the restored site.
 - Fill materials that are free from fine material shall be used.
 - The load of heavy equipment shall be dispersed such that the bearing strength of the soil shall not be exceeded, either by using mats when working in wetlands or by using tracked rather than wheeled vehicles.
- 15) Prior to initiating project-related construction activities, the Applicant shall mark stream channels and existing culvert locations before snowfall obscures their location to avoid damage to these areas.
- 16) During project-related design, the Applicant shall align road and track crossings of water bodies perpendicular or near perpendicular to waterbodies, where practicable, to minimize crossing length and potential bank disturbance.
- 17) During project-related construction, the Applicant shall remove all project-related construction debris (including construction materials, soil, or woody debris) from water bodies, including wetlands, as soon as practicable during the **open-water period**, or prior to break-up for debris on top of or within ice or snow crossings.
- 18) During project-related construction, the Applicant shall not clear **riparian vegetation** within 100 feet of fish-bearing water bodies and 50 feet of non-fish-bearing water bodies and emergent wetlands, unless approved by the Alaska Department of Environmental Conservation.
- 19) The Applicant shall construct project-related water crossings in a manner that minimizes disturbances to streambeds, streambanks, and flow. Measures to meet these goals could include installing bridge piers during the winter, and initially constructing permanent project-related crossing structures, when practicable, to avoid the need to construct both temporary and permanent crossing structures
- 20) During project-related construction, the Applicant shall perform all project-related travel and clearing in a manner that maintains existing surface and subsurface hydrology and water quality, to the extent practicable. Except for off-road travel approved by the land owner, project-related construction activities beyond the 200-foot wide right-of-way (ROW) shall be supported only by ice roads, winter trails, existing or temporary roads, or

air or boat service. Project-related wintertime off-road travel beyond the ROW shall be limited to areas where snow and ice depth are sufficient to protect the ground surface and vegetation. Summertime off-road travel beyond the ROW shall occur only if it can be accomplished without damaging vegetation or the ground surface, including streambanks that may be crossed.

- 21) The Applicant shall design, construct, and use project-related winter roads to avoid degradation of water quality and to protect the roadbed from significant rutting, ground disturbance, or **thermal erosion** of **permafrost** areas. Where feasible and prudent, if the **surface organic mat** is removed or excessively reduced over **thaw-unstable permafrost** terrain, that area shall be stabilized by re-covering it with insulating material, revegetating, or installing **water-bars** as soon as practicable. Soil cuts or fills located in thaw-unstable permafrost terrain shall be avoided to the extent practicable. All cuts shall promptly be stabilized.
- 22) The Applicant shall not mine gravel required for project-related construction within the limits of **ordinary high water** of waterbodies unless otherwise authorized by the Alaska Department of Natural Resources (ADNR), Division of Mining, Land and Water. Applicant also shall consult with the Alaska Department of Fish and Game (ADF&G) and the U.S. Army Corps of Engineers (USACE) prior to conducting these activities. Mine-site development and restoration within the limits of ordinary high water of waterbodies shall be performed in accordance with the reasonable requirements of ADNR, ADF&G and USACE.
- 23) The Applicant shall abandon **geotechnical boreholes** in compliance with the reasonable requirements of the Alaska Department of Environmental Conservation pursuant to 18 Alaska Administrative Code 80.015(e), Well protection, source water protection, and well decommissioning.
- 24) The Applicant shall follow all applicable Federal regulations and standard protocols for transporting hazardous substances and other deleterious compounds to minimize the potential for a spill occurrence near or adjacent to water bodies.
- 25) Prior to construction, the Applicant shall consult with the Alaska Department of Environmental Conservation or other regulatory agencies to determine appropriate regulations and associated requirements for project-related tank storage facilities. At a minimum, the Applicant shall place tank storage facilities as far as practicable from streams or rivers, and implement secondary containment measures (e.g., use of lined and bermed pits).
- 26) The Applicant shall direct the operators of project-related vehicles to not drive in or cross streams other than at crossing points determined by the Alaska Department of Environmental Conservation and U.S. Army Corp of Engineers.
- 27) During project-related construction, the Applicant shall minimize to the extent practicable, the duration and extent of activity at temporary construction facilities, such as staging areas, and provide surface treatments to minimize soil compaction (e.g., **scarify** compacted soils during reclamation to promote infiltration) and promote vegetation regrowth after the facilities are no longer needed to support construction.
- 28) For all project-related crossings of fish-bearing waters that incorporate bridges or culverts, the Applicant shall design, construct, and maintain the **conveyance structures** in

accordance with the National Marine Fisheries Service (NMFS) 2008 publication, “Anadromous Salmonid Passage Facility Design” [NMFS (National Marine Fisheries Service). 2008. *Anadromous* Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon] or equivalent and reasonable requirements.

- 29) The Applicant shall ensure that all project-related culverts and bridges are sufficiently clear of debris to avoid stream-flow alteration and increased flooding. The Applicant shall inspect all drainages, bridges, and culverts semi-annually (or more frequently, if seasonal flows dictate) for debris accumulation and remove and properly dispose of debris promptly.
- 30) During final design, the Applicant shall conduct all siting, design, and development of the rail line and *ancillary facilities* according to the reasonable requirements within the jurisdiction of the Alaska Department of Natural Resources and the Alaska Department of Fish and Game.

2.3 Biological Resources

Applicant’s Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential impacts to biological resources:

- VM-15 The Applicant shall restrict its workers from hunting or fishing while stationed at work camps.
- VM-16 The Applicant shall obtain state permits and authorizations, including the Alaska Department of Fish and Game Fish Habitat Permit. Permit stipulations shall be incorporated into the construction contract specifications.
- VM-17 The Applicant shall time project-related construction in *anadromous* streams to minimize adverse effects to salmon during critical life stages when practicable. The Applicant shall incorporate timing windows [i.e., those time periods when salmon are least vulnerable to disturbances], as specified by the Alaska Department of Fish and Game Division of Habitat, into construction contract specifications for instream work. The Applicant shall design and construct stream crossings so as not to impede fish passage or impair the hydrologic functioning of the waterbody.
- VM-18 When project-related activities, such as culvert and bridge construction, require work in streambeds, the Applicant shall conduct activities, to the extent practicable, during either summer or winter low-flow conditions.
- VM-19 The Applicant shall implement Essential Fish Habitat (EFH) conservation measures as agreed upon with the National Marine Fisheries Service during the EFH consultation process.
- VM-20 The Applicant shall clear vegetation in preparation for project-related construction before or after the typical migratory bird nesting season as identified by the U.S. Fish and Wildlife Service (USFWS)(typically May 1 to July 15), to the extent possible to ensure compliance with the Migratory Bird Treaty Act. If clearing is required during the nesting season, the Applicant shall conduct a nest survey and consult with the USFWS, prior to clearing the vegetation, to identify additional appropriate compliance measures.

- VM-21 During the bald eagle nesting season (typically March through August), the Applicant and its contractor(s) shall use their best efforts to avoid bald eagle disturbance during project-related construction. Nests shall be protected in accordance with U.S. Fish and Wildlife Service guidelines.
- VM-22 Subject to consultation with the Alaska Department of Fish and Game and Alaska Department of Natural Resources, the Applicant shall work with adjacent land managers to develop alternative preferred habitat away from the proposed rail line and construct a widened embankment to allow moose a place to retreat on one side when a train passes in an effort to reduce the potential for moose strikes.
- VM-23 Before final design of the rail line through the Fivemile Clearwater area, the Applicant shall conduct a study, in consultation with relevant agencies [e.g., the Alaska Department of Fish and Game], characterizing the environmental attributes of the area that are critical to the survival of *salmonids* and resident fish species. The information obtained during this study shall be used by the Applicant to minimize potential impacts in the area during project-related construction.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measures as mitigation for potential impacts to biological resources:

- 31) The Applicant shall accommodate the restoration efforts underway by the U.S. Fish and Wildlife Service for Piledriver Slough and other sloughs occurring within the Piledriver Slough drainage during project-related rail line construction and operations. Crossings shall be consistent with ongoing and planned fish habitat restoration efforts to the extent practicable.
- 32) If the Board authorizes Salcha Alternative Segment 1, prior to construction the Applicant shall develop appropriate mitigation in consultation with the Alaska Department of Fish and Game (ADF&G) to prevent blockage of Piledriver and Twentythreemile Sloughs by beaver dams (as a result of reduced flushing flows caused by Applicant-proposed channel plugs). Mitigation may include monitoring conducted by the Applicant at a frequency agreed to by ADF&G.
- 33) Prior to final design, the Applicant shall consult with the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (USACE), and the Alaska Department of Fish and Game (ADF&G) on the precise locations of any highly sensitive areas within the project area. Consistent with the standards of those agencies, *sensitive habitats* could include high-functioning wetland communities, fens, *late-succession forests*, and areas that have moderate to high densities of fine-grained *permafrost* soils, especially if the permafrost area is adjacent to or near a waterbody. Where practicable, the Applicant shall avoid the destruction or fragmentation of highly sensitive areas (as defined by the USFWS and the ADF&G), if they are encountered during project-related surveying and preconstruction activities, through refinements in the project's final design.
- 34) To reduce potential collision and electrocution impacts to birds from power lines and communication towers, the Applicant shall:
 - Consult with the U.S. Fish and Wildlife Service for current guidelines on tower siting, marking, and *guy lines*.

- Incorporate standard, raptor-proof designs (as outlined in “Suggested Practice for Avian Protection on Power Lines: The State of the Art in 2006.” Avian Power Line Interaction Committee. 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. Online at <http://www.aplic.org/>), into the design of electrical distribution lines in areas of identified bird concerns to avoid electrocution of eagles, owls, and other smaller raptors, including:
 - Use of marking techniques such as **balls or flappers** to increase transmission line visibility, especially in areas where sandhill cranes and bald eagles are likely to roost, forage, or nest.
 - Maintaining a minimum 60-inch separation between **conductors** and/or **grounded hardware** and potentially use insulation materials and other applicable measures, depending on line configuration.
 - Incorporate standard raptor-proof designs (as outlined in “Avian Protection Plan Guidelines.” Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service. 2005. Online at http://www.aplic.org) into the design of the electrical distribution lines to reduce bird collisions.
- 35) To the extent practicable, the Applicant shall minimize the project-related ground disturbance, clearing of established vegetation, removal of wildlife habitats and **riparian vegetation**, and re-establishment of vegetation near the railbed that would be attractive to moose.
- 36) The Applicant shall implement standard best management practices to minimize impacts to vegetation during project-related forest clearing, including:
- Minimizing construction vehicle traffic in areas where excessive soil compaction and rutting would cause erosion.
 - Using **low ground pressure construction vehicles** to minimize disruption to soil.
- 37) Prior to construction, the Applicant shall consult with the U.S. Department of Defense Alaska Command, Bureau of Land Management, and Alaska Department of Natural Resources to develop mitigation to address the spread and control of **nonnative invasive plants** (NIPs). The mitigation shall include developing and implementing a monitoring and control plan for NIPs during project-related rail line construction and operations. In addition to specifying that only seed mixes containing native or non-sustaining seed (such as annual rye) that are free of invasive plant species be used, this plan could include:
- Developing and implementing aggressive management programs to limit colonization by invasive plant species and eradicate any invasive species within the rail line right-of-way and support facilities
 - Requiring pressure washing of the wheels, tracks, undercarriages, buckets, etc., of all equipment at staging areas before they are allowed into the construction area and before they would be allowed to cross the Tanana River and the Delta River
 - Implementing procedures to prevent, control, and monitor any NIPs that might germinate as a result of a spill of grain or animal feeds (e.g., hay, pellets) during rail line operations

- Minimizing contact with roadside sources of weed seed that could be transported to other areas
 - Using only certified weed-free straw and mulch for erosion control
 - Ensuring that adequate topsoil depth (minimum 4 inches) and textures are in place and promptly reseeding or revegetating using only plant species native to Interior Alaska
 - Using only seed meeting certified standards pursuant to 11 Alaska Administrative Code 34.075, Prohibited Acts
- 38) The Applicant shall undertake any project-related restoration/revegetation on or adjacent to Bureau of Land Management (BLM)-managed lands in consultation with BLM.
- 39) The Applicant shall comply with reasonable requirements of Title 16, Fish and Game, of the Alaska Statutes pertaining to fish habitat. The Alaska Department of Fish and Game could impose the measures for all project-related activities below the **ordinary high water mark** in specified **anadromous** water bodies and in fish-bearing waters that could block fish passage. These measures could include the following:
- All ice crossings shall be drilled before equipment crossing to determine the ice thickness.
 - Alteration of river, stream, or lake banks or beds, except for approved permanent crossings, shall be prohibited.
 - The operation of equipment, excluding boats, in open-water areas of rivers and streams shall be prohibited. Exceptions for water withdrawal shall be permitted on a site-specific basis.
 - Ice or snow bridges and approach ramps constructed at river, slough, or stream crossings shall be substantially free of extraneous materials (for example, soil, rock, wood, or vegetation) and shall be removed or breached before spring breakup.
 - Bridges are the preferred **watercourse** crossings in fish spawning and important rearing habitats. In areas where culverts are used, they shall be designed, installed, and maintained to provide for efficient passage of fish, and the Applicant shall monitor culverts semi-annually (or more frequently, as seasonal flows dictate) to ensure that they adequately provide for fish passage in fish-bearing waters.
- 40) Unless otherwise approved by the Alaska Department of Fish and Game, the Applicant shall not detonate explosives within, beneath, or in proximity to fish-bearing waters which would result in **overpressures** exceeding 2.7 pounds per square inch unless the water body, including its **substrate**, is frozen solid. Peak particle velocity stemming from explosive detonation shall not exceed 0.5 inch per second during the **early stages of egg incubation**.
- 41) The Applicant shall comply with the reasonable requirements of Alaska Statute (AS) 16.05.841, Fishway Required, and AS 16.05.871, Protection of Fish and Game, regarding project-related winter **ice bridge** crossings and summer ford crossings of all **anadromous** and **resident fish streams**. If necessary, natural ice thickness could be augmented (through removing snow, adding ice or water, or other technique) if site-specific conditions, including water depth, are sufficient to protect fish habitat and maintain fish passage.

- 42) The Applicant shall not narrow an ***anadromous*** water body between its ***ordinary high water marks***, unless authorized in writing by Alaska Department of Fish and Game (ADF&G) prior to construction, thereby enabling ADF&G to apply reasonable design criteria or requirements.
- 43) Project-related water withdrawal from fish-bearing waters shall be subject to prior written approval by the Alaska Department of Natural Resources Division of Mining, Land and Water and the Alaska Department of Fish and Game Division of Habitat and shall reserve adequate flow to support indigenous aquatic life. In implementing this project, the Applicant shall not block a ***watercourse*** to the passage of fish. The Applicant also shall design each water intake directly accessible by fish to prevent the intake, impingement, or entrapment of fish, to the extent practicable.
- 44) The Applicant, in consultation with the Alaska Department of Fish and Game (ADF&G) and the Alaska Department of Natural Resources, shall evaluate, implement, and monitor various aspects of project-related rail design, maintenance, and operations to document moose mortality from collisions with trains, and to develop a strategy to reduce the moose-train collision mortality rate. The strategy could include:
- Maintaining vegetation along the right-of-way (ROW) in primary (e.g., grasses/***sedges***) or late (e.g., old-growth spruce) ***successional stages***. If vegetation is allowed to progress to the secondary successional stage (i.e., shrubs), maintaining it at the shortest possible height, not to exceed 0.5 meter, encouraging shrubs of non-preferred moose browse species (e.g., alder, dwarf birch), and minimizing re-growth of willow, paper birch, and aspen.
 - Mowing vegetation in late summer before energy stores are transferred to the roots.
 - In winter, plowing snow back from the track to the outer edge of the trackside clearing to allow moose easy access away from the tracks when a train approaches.
 - Not seeding grasses after approximately July 15, because fresh green growth has been noted to attract moose to ROWs during early fall, potentially resulting in higher rates of moose/train collisions.
 - Developing a plan in conjunction with the ADF&G to catalog all moose strikes (not just confirmed or suspected deaths) in a timely manner that includes, but is not necessarily limited to: precise location (latitude and longitude), date and time, sex and age of moose; weather and other environmental conditions at time and location of strike; and characteristics associated with the particular train, such as horn use, speed, and track characteristics.
 - Designing, constructing, and operating all aspects of the rail line to minimize significant alteration of moose and other wildlife movement and migration patterns.
- 45) The Applicant shall use appropriate and efficient methods to properly handle, store, and dispose of human food, garbage, and waste. The Applicant shall secure and dispose of food and garbage during project-related construction and operations to prevent bears from gaining access to such materials.
- 46) The Applicant shall prepare and implement a ***bear interaction plan*** to minimize conflicts between bears and humans. In consultation with the Alaska Department of Fish and Game, the Applicant shall develop appropriate educational programs and ***camp layout*** and

management plans when project-related construction and operations plans are being prepared.

- 47) The Applicant shall not conduct project-related construction and land clearing activities within 0.5 mile of known occupied grizzly and black bear dens, unless appropriate alternative mitigation measures are approved by the Alaska Department of Fish and Game (ADF&G). The Applicant shall obtain a list of known den sites from the ADF&G Division of Wildlife Conservation prior to commencement of any project-related activities and shall report occupied dens encountered.
- 48) The Applicant shall prohibit workers from harassing wildlife, including winter or calving moose and bears within known occupied dens during project-related construction and operations. The Applicant shall instruct workers not to feed wildlife.
- 49) The Applicant shall coordinate with U.S. Department of Defense Alaska Command and the Bureau of Land Management regarding fire suppression to minimize potential fires caused by project-related construction and operations.

2.4 Cultural Resources

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measure for mitigating potential impacts to cultural resources:

- VM-24 The Applicant shall develop protocols to inform and prepare construction supervisors of the importance of protecting archaeological resources, graves, and other cultural resources and how to recognize and treat the resources.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measure as mitigation for potential impacts to cultural resources:

- 50) The Applicant shall comply with the Programmatic Agreement developed through the Section 106 process under the National Historic Preservation Act.

2.5 Subsistence

Applicant's Voluntary Mitigation Measures

The Applicant did not identify measures for mitigating potential impacts to subsistence.

SEA's Final Recommended Mitigation Measures

SEA recommends the following measure as mitigation for potential impacts to subsistence:

- 51) To the extent practicable, the Applicant shall schedule project-related construction activities that may temporarily block access to trails and waterways to occur during times of limited use of those trails or waterways, or when alternative routes to the temporarily blocked trails or waterways are most available.

2.6 Climate and Air Quality

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential impacts to climate and air quality:

- VM-25 To minimize fugitive dust emissions created during project-related construction activities, the Applicant shall implement appropriate fugitive dust suppression controls, such as spraying water or other established measures. The Applicant shall also operate water trucks on haul roads as necessary to reduce dust.
- VM-26 To limit project-related construction emissions, the Applicant shall work with its contractor(s) to ensure that construction equipment is properly maintained and that required pollution-control devices are in working condition.

SEA's Final Recommended Mitigation Measures

SEA did not identify recommended mitigation measures for potential impacts to climate and air quality.

2.7 Noise and Vibration

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measure for mitigating potential impacts from noise:

- VM-27 The Applicant shall work with its construction contractor(s) to minimize, to the extent practicable, construction-related noise disturbances near residential areas. Construction and maintenance vehicles shall be in good working order with properly functioning mufflers to control noise.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measures as mitigation for potential impacts from noise and vibration:

- 52) The Applicant shall consult with affected communities regarding its planned construction schedule to minimize, to the extent practicable, project-related construction noise and vibration disturbances in residential areas during evenings and weekends.
- 53) Prior to initiating construction activities related to the proposed rail line, the Applicant shall establish a Community Liaison to consult with affected communities, landowners, and agencies. Among other responsibilities, the Community Liaison shall assist communities or other entities with the process of establishing *quiet zones*, if requested.

2.8 Transportation

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential impacts to transportation.

- VM-28 The Applicant shall establish a Diagnostic Team comprising Applicant staff, community members, representatives of the Alaska Department of Transportation and Public Facilities and other entities regarding project-related roadway/rail line crossings in consultation with Federal Railroad Administration safety officials. This process shall result in appropriate safety measures for every roadway/rail line crossing.
- VM-29 The Applicant shall coordinate with Federal, state, and local emergency management officials in the project area. The Applicant shall provide, upon request, applicable hazardous-materials training and/or project-related information to enhance readiness. The Applicant shall incorporate the new rail line into its existing emergency response process and shall update its Oil Spill Contingency Plan to include the new rail line.
- VM-30 During construction of project-related tracks across existing roads, the Applicant shall notify road users of temporary road closings and other construction-related activities. The Applicant shall provide for detours and associated signage, as appropriate, or maintain at least one open lane of traffic at all times to allow for the quick passage of emergency and other vehicles. The Applicant shall display signs providing the name, address, and telephone number of a contact person onsite to assist the public in obtaining immediate responses to questions and concerns about project activities.
- VM-31 To the extent practicable, the Applicant shall confine all project-related construction traffic to project-specific roads within the right-of-way (ROW) or established public roads. Where traffic cannot be confined to these roads, the Applicant shall make necessary arrangements with landowners to gain access. The Applicant shall remove and restore upon completion of project-related construction any temporary access roads constructed outside the rail line ROW unless otherwise agreed to with the landowners.
- VM-32 The Applicant shall coordinate with U.S. Department of Defense Alaska Command and Bureau of Land Management personnel, as appropriate, regarding project-related activities occurring within military base and training areas.
- VM-33 The Applicant shall consult with appropriate state and local transportation agencies to determine the final design and other details of project-related grade crossings and warning devices.
- VM-34 For each of the public grade crossings on the new rail line, the Applicant shall provide permanent signs prominently displaying both a toll-free telephone number and a unique grade crossing identification number in compliance with Federal Highway Administration regulations (23 Code of Federal Regulations Part 655). Applicant's personnel shall answer the toll-free number 24 hours a day.

SEA's Final Recommended Mitigation Measures

SEA did not identify any recommended mitigation measures for potential impacts to transportation.

2.9 Navigation

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential impacts to navigation:

- VM-35 The Applicant shall obtain a Section 9 Bridge Permit from the U.S. Coast Guard for construction of bridges over navigable rivers (e.g., Tanana River, Little Delta River, Delta River, and Delta Creek). Permit stipulations shall be incorporated into the construction contract specifications.
- VM-36 In coordination with the U.S. Coast Guard, the Applicant shall provide adequate clearances for navigation of recreational boats on navigable rivers.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measures as mitigation for potential impacts to navigation:

- 54) In coordination with the Alaska Department of Natural Resources (ADNR), the Applicant shall ensure that project-related bridges and culverts placed on navigable or public waters, as determined by the ADNR, are designed and installed to accommodate:
- Navigation by recreational boat users in a manner that shall not impede existing uses, to the extent practicable, and
 - Public access and use of the *statutory easements* as established by the reasonable requirements of Alaska Statute 38.05.127, Access to Navigable or Public Water.
- 55) If the Surface Transportation Board authorizes Salcha Alternative Segment 2 and it is built, the Applicant shall ensure that existing recreational boat access to the Fivemile Clearwater area is maintained.

2.10 Land Use

Applicant's Voluntary Mitigation Measures

The Applicant voluntarily proposed the following measures for mitigating potential impacts to land use:

- VM-37 Prior to initiation of construction activities related to this project, and for 1 year following start-up of operations on the new rail line, the Applicant shall provide a Community Liaison to consult with affected communities, businesses, and agencies; develop cooperative solutions to local concerns; be available for public meetings; and conduct periodic public outreach. The Applicant shall provide the name and telephone number of the Community Liaison to mayors and other appropriate local officials in each community through which the new rail line passes.

- VM-38 The Applicant shall continue its ongoing community outreach efforts by maintaining a web site about the project throughout the construction period of the rail line.
- VM-39 In the event of any damage caused by project-related construction activities, the Applicant shall work with affected landowners to appropriately redress any damage to each landowner's property.
- VM-40 The Applicant shall address concerns about fragmentation of neighborhoods and farm properties as a result of this project by maintaining the connectivity of major roadways and working with local residents on specific right-of-way acquisition issues.
- VM-41 The Applicant shall work with affected businesses or farms to appropriately address project-related construction activity issues affecting any business or farm.
- VM-42 To the extent practicable, the Applicant shall ensure that entrances and exits for businesses are not obstructed by project-related construction activities, except as required to move equipment.
- VM-43 The Applicant shall consider fencing on a case-by-case basis for agricultural areas as affected by this project.
- VM-44 Depending on the routing alternative(s) that are approved, during construction of the crossings over navigable rivers, some short-term temporary restrictions of watercraft traffic could occur for safety purposes. In that event, the Applicant shall install warning devices to notify boaters of project-related bridge construction activities. The Applicant also shall display signs providing the name, address, and telephone number of a contact person onsite to help waterway users obtain immediate responses to questions and concerns about project activities.
- VM-45 The Applicant shall make reasonable efforts to minimize disruptions to utilities by scheduling project-related construction work and outages to low-use periods. The Applicant shall notify residents and other utility customers in advance of project-related construction activities requiring temporary service interruptions.
- VM-46 As part of the National Pollutant Discharge Elimination System Stormwater Construction Permit and Stormwater Pollution Prevention Plan, the Applicant shall:
- Restore land used for temporary staging areas during project-related construction to natural conditions if occurring on undeveloped Alaska Department of Natural Resources land or to its former uses if occurring on military or private land.
 - Restore public land areas that were directly disturbed by project-related construction equipment and not owned by the Applicant (such as temporary access roads, haul roads, and crane pads) to their original condition, as reasonable and practicable, upon completion of construction.
 - In business and industrial areas, store project-related equipment and materials in established storage areas or on the Applicant's property. The Applicant shall prohibit parking of equipment or vehicles, or storage of materials along driveways or in parking lots, unless agreed to by the property owner.
 - Prohibit project-related construction vehicles, equipment, and workers from accessing work areas by crossing business or agricultural areas, including parking areas or driveways, without advance notice to/permission from the owner.

- VM-47 The Applicant shall make reasonable efforts to identify all utilities that are reasonably expected to be materially affected by the project-related construction within the right-of-way (ROW) or that cross the ROW. The Applicant shall consult with utility owners during design and construction so that utilities are protected during project-related construction activities. The Applicant shall notify the owner of each such utility identified prior to project-related construction activities and shall coordinate with the owner to minimize damage to utilities.
- VM-48 The Applicant shall require contractor(s) to dispose of waste generated during project-related construction activities in accordance with applicable and reasonable Federal, state, and local regulations.
- VM-49 In accordance with the Applicant's Oil Spill Contingency Plan and Emergency Response Plan, the Applicant shall make the required notifications to the appropriate Federal and state environmental agencies in the event of a reportable hazardous materials release. The Applicant shall work with the appropriate agencies, such as the Alaska Department of Environmental Conservation, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service, to respond to and remediate releases.
- VM-50 Before the start of project-related operations, the Applicant shall provide information such as emergency contact numbers, access points, plans for operations and the location(s) of emergency equipment in order that local, state and Federal agencies may incorporate that information into local response plans as may be needed.
- VM-51 At least one month before initiating construction activities in the area, the Applicant shall provide the information described below regarding project-related construction of the new rail line, and any additional information, as appropriate, to fire departments within the project area, the Federal Emergency Management Agency, the Fairbanks North Star Borough Emergency Operations Department, and the Delta Greely Local Emergency Planning Committee:
- The schedule for construction throughout the project area, including the sequence of construction of public grade crossings and approximate schedule for these activities at each crossing;
 - A telephone number for the Applicant's contact, who shall be available to answer questions or attend meetings for the purpose of informing emergency-service providers about the project-related construction and operations; and
 - Revisions to this information, including changes in construction schedule, as appropriate.

SEA's Final Recommended Mitigation Measures

SEA recommends the following additional measures as mitigation for potential impacts to land use:

- 56) Prior to construction, the Applicant shall consult with Alaska Department of Natural Resources (ADNR) and other appropriate agencies and user groups to develop a plan to ensure construction activities occur during the most appropriate timeframe to limit potential impacts on recreation activities. The final plan shall comply with all reasonable requirements and conditions as determined by the ADNR pursuant to Alaska Statute

42.40.460, Extension of the Alaska Railroad. The Applicant also shall comply with the following measures:

- The plan shall be developed prior to completion of final engineering plans following consultation with the ADNR, the Alaska Department of Fish and Game, other appropriate government agencies, and user groups to determine the location of all established and recognized state trails, including informal, legal trails on state land, and the pattern of recreation activities (time and location of most frequented recreation areas).
 - The plan shall designate temporary access points if main access routes must be obstructed during project-related construction and include an agreed-upon number and location of access points as determined during consultation with applicable agencies.
- 57) The Applicant shall consult with the U.S. Army Corps of Engineers, the Alaska Department of Natural Resources Division of Mining, Land and Water, and Alaska Department of Fish and Game regarding project-related construction and operation activities and the proposed Moose Creek grade separation between the existing Alaska Railroad Corporation main line and Richardson Highway.
- 58) If the Surface Transportation Board authorizes Salcha Alternative Segment 2 and the segment is built, the Applicant shall consult with the Alaska Department of Transportation and Public Facilities, Fairbanks North Star Borough (FNSB) Department of Parks and Recreation, FNSB School Board, Salcha School, and the Salcha Ski Club to determine the precise extent of potential effects to the Salcha School and the Salcha Ski Area. Mitigation could include, but would not be limited to, full relocation and reconstruction of affected recreation and school facilities, parking lots, and recreation-support facilities of all types for both the school and ski area. The Applicant also shall strive to perform project-related construction to minimize disturbance of recreational activities at the school and ski area and to the cross-country ski season. The Applicant shall ensure availability of an alternative school facility during project-related relocation of the Salcha School.
- 59) If the Surface Transportation Board authorizes Eielson Alternative Segment 3 and this route is authorized by the U.S. Army Corps of Engineers and it is built, the Applicant shall consult with Eielson Air Force Base (AFB) and other agencies as appropriate to determine appropriate measures to mitigate impacts based on final design of the segment to existing and planned uses of the Eielson AFB Outdoor Recreation Area and adjoining AFB property between Richardson Highway and Piledriver Slough. The Applicant shall implement the resulting specific mitigation measures, which could include, but are not limited to, construction of alternative access roads to existing campsites, creating grade-separated crossings (thus negating the necessity of using locomotive horns for at-grade crossings), expansion of parking areas, and moving of campsite locations outside the affected area.
- 60) The Applicant shall consult with the appropriate management agencies, including the Alaska Department of Natural Resources and the Alaska Department of Fish and Game to ensure that project-related bridges and culverts are designed, constructed, and maintained to accommodate travel by winter modes of transportation (snow machine, dogsled, etc.) on streams and rivers used for recreational access, as determined under mitigation measure 54. At a minimum, these travel accommodations shall be made for project-related crossings of Piledriver Slough, the Little Salcha River, the Fivemile Clearwater

River, and the Richardson Clearwater River, all of which are commonly used for winter transportation.

- 61) The Applicant shall consult with resource management agencies including the Fairbanks North Star Borough, the Alaska Department of Natural Resources, the Alaska Department of Fish and Game, the Bureau of Land Management, and appropriate trail user groups regarding provision, access, and design of crossings for trail easements that intersect with the new rail line. Consultation shall include concerns related to general ***dispersed-use access***, informal public trails on state land, ***blazed section lines***, and long stretches of rail line without designated public crossings.
- 62) The Applicant shall, in collaboration with appropriate agencies, including the Alaska Department of Natural Resources, the Alaska Department of Fish and Game, and the Bureau of Land Management, provide crossings for the following trails: the trail to the Blair Lakes Area; Silver Fox Lodge Trail; Alaska Department of Natural Resources (ADNR) Winter Trail (the Applicant has included two crossings of this trail as part of the Proposed Action); Koole Lake Trail; Donnelly-Washburn Trail; ADNR Forestry Winter Road; and Rainbow Lake Trail. Providing crossings could include the elimination of multiple crossings by relocating the trail.
- 63) The Applicant shall, in collaboration with appropriate resource management agencies, including the Fairbanks North Star Borough Department of Parks and Recreation (FNSB), the Alaska Department of Natural Resources (ADNR), and the Alaska Department of Fish and Game (ADF&G), provide the following:
 - a. If the Board authorizes Eielson Alternative Segment 1 and it is built, provide five crossings of the Twentythreemile Slough Dog Mushing Trails;
 - b. If the Board authorizes Eielson Alternative Segment 2 and it is built, provide five crossings of the Twentythreemile Slough Dog Mushing Trails;
 - c. If the Board authorizes Delta Alternative Segment 2 and it is built, provide one crossing for Phillips Road/Delta Junction Area Trail Network;
 - d. If the rail line would cross any “Important Trails in the Planning Area” (as listed in the Tanana Basin Area Plan, Alaska Department of Natural Resources, updated 1991) on non-Federal lands, the Applicant shall consult with the applicable landowner(s) to identify additional potential trail crossings, and report the results of those consultations to the Surface Transportation Board prior to finalizing engineering design plans for the affected sections of the rail line.
- 64) Prior to construction, the Applicant shall consult with appropriate agencies and user groups (which could include the Fairbanks North Star Borough Department of Parks and Recreation, the Alaska Department of Natural Resources, the Alaska Department of Fish and Game, the Bureau of Land Management, Eielson Air Force Base, Fort Greely, Fort Wainwright, and the Salcha Dog Musers Association) to determine a construction period of least disturbance to recreation activities associated with waterways and the trail system.
- 65) When project-related construction takes place on state and private land, the Applicant shall consult with the Alaska Department of Natural Resources Division of Forestry to salvage or dispose of commercial and personal use timber within the right-of-way in accordance with the Forest Practices Act and the Tanana Valley State Forest Management

Plan objectives. Timber salvage and disposal shall comply with Alaska Statute 41.17.082, Control of Infestations and Disease.

- 66) When performing project-related construction activities anywhere on military lands, the Applicant shall coordinate with the Fort Wainwright contaminant specialists regarding suspected, known or newly discovered contamination sites on military lands, if any.
- 67) The Applicant shall coordinate with the Bureau of Land Management (BLM)/ U.S. Department of Defense Alaska Command (ALCOM) and the U.S. Air Force 354th Fighter Wing Command from Eielson Air Force Base during the right-of-way (ROW) approval process, and the ROW instruments issued by BLM/ALCOM and the U.S. Air Force 354th Fighter Wing Command shall include stipulations to ensure military use is not adversely affected by project-related construction and operations.
- 68) If unanticipated sources of hazardous or regulated materials are encountered during project-related construction activities (such as along the Haines Fairbanks Pipeline right-of-way in the Delta Junction area), the Applicant shall immediately notify the Alaska Department of Environmental Conservation and stop all work in the area until a corrective action plan has been approved. Handling, treatment, and disposal of any hazardous materials shall be in full compliance with all Federal, state, and local requirements.
- 69) The Applicant shall conduct project related right-of-way acquisition in conformance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 *et seq.*), regulations promulgated pursuant to that statute (49 Code of Federal Regulations Part 24), and all reasonable terms and conditions of Alaska Statute 34.60.010 through 34.60.150, Relocation Assistance and Real Property Acquisition Practices.

2.11 Visual Resources

Applicant's Voluntary Mitigation Measures

The Applicant did not identify any measures for mitigating potential impacts to visual resources.

SEA's Final Recommended Mitigation Measures

SEA recommends the following measures as mitigation for potential impacts to visual resources where the rail line would be located on Bureau of Land Management-administered land:

- 70) To minimize the visual impact of the cleared right-of-way for this project, the Applicant shall:
 - Locate permanent structures, such as maintenance facilities, (excluding safety-related devices) associated with the rail line as far from road crossings as practicable to avoid attracting visual attention.
 - Minimize clearing at road crossings, which could be accomplished by leaving a few larger trees and some smaller trees and shrubs untouched, to reduce visual contrast and mimic natural clearings in the landscape, where consistent with crossing safety.
 - Plant native trees and bushes densely around the base of bridge supports located on land to break up the uniform lines, colors, and smooth textures of the bridge supports when appropriate given maintenance, access, and safety considerations and natural

vegetation patterns. Plant species that are preferred by moose as browse shall be avoided to the extent practicable.

- 71) Where practicable to reduce visual impact in areas of high visibility (such as residential areas) without increasing the project footprint, the Applicant shall:
- Plant native vegetation along the right-of-way to reduce the contrast with line, color, and texture. Plant species that are preferred by moose as browse shall be avoided to the extent practicable.
 - In areas with hill cuts, shape slopes to reflect the natural landscape, where practicable, and plant with native materials to provide an amorphous and irregular form and rough texture.
 - Dispose of excess material in a suitable fill location and not cast on downhill slopes.

2.12 Glossary of Mitigation Terms

Anadromous – anadromous fish reproduce in freshwater, and the offspring migrate to the ocean to grow and mature, and return to freshwater to reproduce.

Ancillary facilities – facilities that are part of the proposed action and that would be constructed to support rail activities such as communications towers, a passenger facility, and sidings and are necessary for operation of the rail line.

Balls or flappers – Brightly colored balls are attached to transmission lines to provide greater visibility. Flappers are used to deter birds and other wildlife from landing on transmission lines.

Bear interaction plan – a plan to minimize the interaction between humans and bears; often details garbage management.

Blazed section lines – section lines marked (usually using paint on trees) by a surveyor.

Braided river – a river consisting of a network of small channels separated by small, often temporary, islands.

Brush layering – a revegetation technique that combines layers of dormant (living woody plants that are not actively growing) or rooted cuttings with soil to revegetate and stabilize streambanks and slopes; branches are placed to provide reinforcement to the soil.

Brush matting – a revegetation technique that provides a protective vegetative covering (in the form of a brush mat of dormant branches that will root and grow) to a slope.

Camp layout – the configuration for temporary housing facilities.

Coir logs – interwoven coconut fibers that are bound together with biodegradable netting and provide temporary physical protection to a site while vegetation becomes established; often used to secure the base or toe of a slope in low velocity areas.

Conductors – part of a transmission line through which electricity passes.

Conveyance structure – a structure to convey water, e.g. a pipe, culvert, or bridge.

Dispersed-use access – a management concept that encourages use over an entire area, rather than concentrated in a particular area.

Early stages of egg incubation – could occur any time between spring and late fall depending on the fish species and location.

Equalization culvert – a culvert placed under the rail bed to allow for water flow at a location other than a waterbody.

Geotechnical borehole – a narrow shaft drilled into the ground to obtain information on the physical properties of the rock and soil below the ground surface.

Grounded hardware – hardware used on or in conjunction with transmission lines that is connected to the ground so as to prevent an electrical short.

Guy line – a rope or cable used to provide support and stability to a structure.

Hydraulic analyses – in this context, analysis that would examine the potential change in river flow characteristics, including river water elevation, related to bridge characteristics, including bridge opening width and elevation.

Ice bridges – frozen structures formed over river or lake surfaces to facilitate vehicular and other modes of human access.

Jute matting – an organic geotextile that forms a mulch that suppresses weed growth and increases moisture retention in the soil to promote revegetation.

Late-succession forests – a forest that includes mostly mature and old-growth trees.

Low ground pressure construction vehicles - construction equipment that is either lighter-weight than normal, or has a higher surface area to distribute its weight, either by using tracks instead of tires or larger or a greater number of tires.

Nonnative invasive plants – plants that are not native to an area, have few or no natural predators and, therefore, proliferate easily in an area which adversely affects the ecology of the areas they invade, often resulting in the loss of native plant life due to overwhelming competitive pressures.

Open water period – period of time during which a waterbody is not frozen.

Ordinary high water mark – the point on a streambank at which surface water is so continuous that the streambank is marked by erosion, absence of woody terrestrial vegetation, or predominance of aquatic vegetation.

Overly constricting active channels – excessive narrowing of stream channels through which water current flows (as distinct from channels that currently do not convey water).

Overpressures – a pressure shock wave, usually resulting from the detonation of an explosive, which measures over and above normal air or water pressure.

Permafrost – permanently frozen ground; a thermal condition of soil or bedrock in which the ground exists at a temperature below freezing for a number of years.

Quiet zone – an area in which locomotive warning horns are not sounded at at-grade highway-rail crossings. The Federal Railroad Administration has primary authority over quiet zones which can be established pursuant to the process in 49 CFR Parts 222 and 229, Use of Locomotive Horns at Highway-Rail Grade Crossings, Final Rule.

Resident fish streams – streams that support fish that do not migrate and remain year-round.

Riparian vegetation – Generally describes vegetative communities located on the banks of natural waterbodies such as rivers, lakes, and tidewater areas.

Salmonid – belonging to the family Salmonidae, which includes the salmon, trout, and whitefish.

Scarify – to break up or loosen surface soil, generally to facilitate revegetation.

Scour – erosion of streambed material, resulting in temporary or permanent lowering of streambed elevation or the location of the stream channel.

Sedges – a family of flowering plants that resemble grasses or rushes, often associated with wetlands or areas with poor soils.

Sensitive habitat areas – areas containing or supporting organisms that are rare or valuable; these areas are often designated by a governmental entity.

Statutory easements – an agreement, either temporary or permanent, that allows access to a piece of property for a specific use.

Subsidence – the motion of a surface of land shifting downward to form a depression.

Substrate – in this context, the surface material at the bottom of a waterbody.

Successional stages – a natural progression of plant inhabitation of bare ground, often occurring in different stages; i.e., initially annuals and perennials, then small woody plants, then trees.

Surface organic mat – a dense clump of vegetative matter, usually found floating on the surface of a waterbody.

Thaw-unstable permafrost – Permafrost in poorly drained, fine grained soils, especially silts and clays that contain more ice than water; unstable because thawing can result in loss of strength, excessive settlement, and soil containing so much moisture that it flows.

Thermal erosion – the erosion of ice-bearing permafrost through warming.

Velocity profiles – the variation of water velocity within a vertical distance from the stream bed to the water surface.

Water-bar – an erosion control structure, such as a log or timber installed across a trail; used to intercept flowing water and divert it into a stable drainage way or vegetated area.

Watercourse – a natural or artificial channel through which water flows.